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Packard's figure (in AMERICAN NATURALIST, l. c.) has tarsi as in the first named genus, one or two jointed. In *Phrixis* they are much as in *Phalangium*, which the species also resembles in its long limbs.

PHRIXIS LONGIPES Cope, sp. nov. Legs eight times as long as the body, tarsus of the shorter with five, those of the longer with six joints, those of the longest not counted. The first and second segments are very long; tibiæ shorter than femora; coxæ subglobular. Legs with scattered, rather short hairs. Last tarsal joint with one claw and an opposing bristle, in two limbs as long as femora, exceeding total of body, with two claws. Palpi five jointed, the third, fourth and fifth with large spines on each side, the second, or vertical, with four near the base directed forwards and two near the upper end directed inwards. Mandibles pubescent. Five narrow, and one terminal, segments of the abdomen, the penultimate wider than the others. Body pubescent. Color very pale, with a straw-colored shade. Length of body 1.17 lines, or m.00225; longest leg m.02.

This species, though small, considerably exceeds the *Acanthocheir armatus* in dimensions.

STYGOBROMUS Cope.

Gen. nov. *Gammaridarum.* Near *Gammarus.* The first antennæ with flagellum, and much shorter than the second. Two pairs of limbs chelate by the inflexion of the last claw-like segment; other limbs clawed. Terminal abdominal segment very short, spiniferous; the penultimate segment with a stout limb with two equal styles, the antepenultimate short, two-jointed and undivided. Eyes none.

This genus is nearer to the true *Gammarus* than the allied genus described from the Austrian Caves, the *Niphargus* of Schiödte.* In the latter the first antennæ are the larger, and the body terminates in a very long style; the last abdominal limb is undivided like that which precedes it. In *Stygobromus* the penultimate limb is like that represented by Schiödte for *Niphargus*, though I am not certain whether it is homologically identical. The last limb is about equally divided, but the simple basis is long and stout.

It is just possible that the antepenultimate limb represents the basis and one style only, for in that of one side a slight process appears at the extremity of the basal segment, though it is not visible on that of the other. The terminal limbs are recurved and appressed to the last abdominal segment, forming a fulcrum or prop. The animals of this genus are aquatic, and swim much as the common *Gammari.* The absence of eyes is another example of the adaptation to darkness.

STYGOBROMUS VITREUS Cope. "Gammaroid Crustacean" Cope, Ann. Mag. Nat. Hist., Nov., 1871. Two last pairs of limbs appressed to last abdominal bristles and of nearly equal length, forming a brush. Last segment of abdomen with two terminal bristles. Last segment of the limbs from the third to the seventh, with a long, straight claw directed forwards. Fringed limbs behind this point very small. Outer or second antennæ half as long as the first, which embrace eleven segments, and are about as long as the last five abdominal segments. Total length of head and body 2.1 lines or .0045 m.

There are few conspicuous hairs, the most so are those which stand at the extremity of the last joint of the limbs, rising from the base of the claw. Color translucent.

REVIEWS AND BOOK NOTICES.

VEGETABLE PARASITES AS CAUSES OF DISEASE.†—The first of these two papers gives the recent ideas, as seen by an able and advanced observer, in regard to those forms of cryptogamic vegetation whose growth is believed to be the cause of Ringworm, Favus, and a few similar affections. Dr. White discusses the nature and history of these cryptogamia, their relations to each other and to common moulds, and their importance as sources of contagion; while, with much good sense and rare judgment, the question of treatment is quietly left to the professional books.

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* Proc. Entom. Soc., London, 1851, p. 150.

† Vegetable Parasites, and the diseases caused by their growth upon man. By James C. White, M.D., Prof. of Dermatology in Harvard University. 8vo pamphlet. Boston. 1872.

On the development of Vegetable Organisms within the Thorax of Living Birds. By Dr. James Murie, F.L.S., etc.; Lecturer on Comp. Anat., Middlesex Hospital. Read before the Royal Microscopical Society, Jan. 3, 1872.

Dr. White's general introductory view of the microscopic fungi is clear and significant, and forms a convenient ground for the comparison of views even by those whose ideas are inconsistent with it. The nutritive system, or *mycelium*, consists of slender cells or tubes, branched; intertwined, and furnished with occasional transverse partitions. This may increase directly by subdivision into cells with similar powers of branching and of self-multiplication, or by the production at the ends of some of the branches of minute spherical or ovoid cells inclosed in capsules called sporangia, or growing in bushes or bead-like chains, when they are called *conidia* or *spores*. These conidia may be found detached, either single or in rows or compound cells, and are capable of reproducing the mycelium. Under certain conditions the substance, called plasma, of these various forms may become cloudy and divided into infinitely small free cells which multiply by self-division and may exhibit peculiar movements. These cells or points, if more or less spherical, are called *micrococcus*; if somewhat elongated and swollen at one end, bacteria; and if joined in minute chains, vibriones. They have been much and loosely discussed, and are supposed to be the primitive forms of organic life. In suitable fluids they develop into larger cells, single or united and sometimes elongating like mycelium, known as ferment cells. This is the submerged form of fungus life, familiarly observed in the yeast plant and other ferments; and is capable of reversion to micrococcus, or under favorable circumstances may attain to mycelial and conidial development. It closely resembles the spores of ringworm, etc.

These forms make up the structure of the moulds, and their varying size, shape, and predominance have been regarded as specific characters; but recent observations show that such variations may be due to the nature of the soil and atmospheric conditions, and that the recently recognized species are often varieties of well known individuals, prevented from their usual development by circumstances of position. This tendency to variation has been termed pleomorphism.

These low forms of vegetation occasion the processes of fermentation by which important chemical products are obtained; and they change dead matter (so called) into the state best fitted for the support of future generations. They may also live at the expense of the living tissues of plants and animals, although possibly only upon those which are depressed by some cause below a full vital energy. The muscadine of the silk worm and the oidium of the Madeira vineyards are cited as examples of the importance of such destructive agency.

The effects of such fungi upon the surface of men are never fatal, or constitutionally hurtful, but they are greatly annoying and may last for many years. Schœnlein in 1839 first recognized the cryptogamic character of the crusts of Favus; and after much dispute, the following affections are now safely referred to similar causes—Ringworm (in which the author includes as varieties *Eczema marginatum*, *Tinea tonsurans*, *Sycosis*, and *Ringworm of the Nail*) and *Pityriasis versicolor*. Still a subject of dispute is *Alopecia areata*, and *Myringomycosis*, both of which are often accompanied if not caused by cryptogamic growths. On the other hand the *chignon-fungus* and some other controverted cases are safely considered pseudo-parasites.

Several of these parasitic plants are common upon the domestic animals, and in some instances may possibly have been originally derived from them.

On the question of the identity of the several vegetable parasites, and their relations to the common moulds, much study has been expended, and with remarkably contradictory results. Equally safe observers reach the extreme opposite conclusions. The methods of investigation are clinical observation, artificial inoculation, and development of the fungi by cultivation. Clinically favus is distinct, and the others are separable with reasonable certainty: inoculation leads to the same conclusion, notwithstanding the deceptive inferences which may easily be drawn from accidental coincidences: and cultivation, while it usually furnishes an abundance of penicillium, aspergillus and other familiar moulds, is so liable to error from their accidental introduction that it has as yet, in the author's judgment, furnished no sufficient data for admitting the identity of the subjects of the paper with any of the common moulds.

The vegetable parasites are an occasional cause of alterations of the epidermis and its appendages, causing baldness, etc. They are communicated by actual contact rather than by the aërial transmission of spores; and are therefore usually avoidable by ordinary care. With the exception of the varieties of ringworm, they are comparatively rare. Some, but not all of them, are particularly liable to attack debilitated constitutions. Schools, and especially orphan asylums, and barbers' shops have heretofore furnished most frequently the conditions essential to the spread of these forms of vegetation.

A more curious branch of this subject is the occurrence of vegetable organisms within the closed cavities of living animals. That organisms usually presumed to be dependent upon some parentage for their existence should grow within cavities communicating with the external air, as the stomach for instance, is really a case of external parasitism; as the germs might be easily introduced by the air or otherwise. Of far different importance is the occurrence of such growths within tissues or cavities having no external openings. The presence of parasitic animals in the eye, brain, etc., and of mould within the thorax and other closed cavities of living animals, has seemed to many to have an important bearing upon the question of spontaneous generation. At the present time, however, when the possibility of the passage of solid particles through uninjured living tissues is believed by many if not by most microscopists, the entrance of the germs is no longer incredible.

Dr. Murie reports three new cases of vegetable-like mould found within the thorax of birds. Two of the three birds were known to be ill for a short time before death. No cause of death, unless the fungus be considered such, was known. The cryptogamic growth was in all the cases a greenish white patch upon a thickened and injected portion of the pleural membranes. In one case the lungs exhibited spots of lobular pneumonia. Under a microscope the vegetation revealed linear, interlaced filaments and innumerable echinate circular cells, and under higher powers, oval or elliptical cells distinctly nucleated. Mr. Cooke hinted the possibility that these growths were algæ: but Dr. Murie is convinced that they are a species of *Aspergillus*, of the order Mucedines, the microscopical elements above mentioned being the mycelium and spores of the fungus. Although such appearances have been sometimes considered as of post-mortem production, he believes that the spores were introduced by the breath into the lungs, penetrated the moist and delicate tissues, and by development occasioned the death of the birds; some antecedent state of the system being admitted as rendering possible the development of the fungus.

Including these new cases, eighteen kinds of birds are recorded as liable to attacks of fungi, either accompanying or causing fatal disease. As they belong to many different groups of birds it may be inferred that the whole class is predisposed to them under special but yet unknown conditions; these moulds, as far as at present definitely determined, belong to two or three species of *Aspergillus*, and derive great importance from the interest at present attached to the investigation and control of cryptogamic causes of disease. —R. H. W.

BOTANY.

Exuberance of Pollen.—For many years I have observed with wonder, in the early summer, or about the month of June, the immense amount of pollen scattered in the vicinities where coniferous trees and shrubs are abundant. On the Great Lakes I have often noticed the surface of the water covered for miles with a thick coating of this yellowish deposit, looking as if it was strewn with sulphur, which in calm weather continued for days together. At times, indeed, it is so difficult to get the water free from the pollen that it is rather unpleasant for drinking, cooking, or washing purposes.

In walking through grounds where the Juniper (*Juniperus communis* Linn.) covered the sterile soil, I have frequently noticed the clouds of golden dust which I raised, and that my boots were yellow from the pollen. What remarkable prodigality this displays on Nature's part. It is difficult to conceive a use for the pollen thus spread over the land and the lake waters; though there may be one hidden from us.

This superabundance of the male principle, which seems to be the rule throughout Nature, is a peculiarly interesting and suggestive fact, and worthy of more investigation and thought than it has heretofore received.

In plants, insects carry off a considerable quantity of the pollen: bees, for example, to make bee-bread; and we may know a few more instances of its use besides its legitimate one of fertilization. But all of these taken together would scarcely make